

CLAIMS

What is claimed is:

1. A system for use in a process plant, comprising:
 - a first data source including economic data related to economic factors associated with the operation of the process plant;
 - a second data source including process control data related to control operations within the process plant;
 - a model that models the operation of the plant using the economic data and the process control data and that produces a model output;
 - an application that uses the model output to perform a function with respect to the operation of the process plant; and
 - an information server communicatively connected between the first and second data sources and the model, the information server including a router;wherein the first and the second data sources are adapted to automatically send the economic data and the process control data to the information server via first and second messages and wherein the router is adapted to process the first and second messages to determine that the economic data and the process control data contained within the first and second messages is to be sent to the model and to automatically deliver the economic data and the process control data to the model.
2. The system of claim 1, wherein the first data source includes economic data pertaining to a cost of a material used in the process plant.
3. The system of claim 1, wherein the first data source includes an indication of the throughput of the process plant.
4. The system of claim 1, wherein the second data source includes a field device disposed within the process plant.

5. The system of claim 1, wherein the second data source includes a process controller communicatively connected to one or more field devices disposed within the process plant.
6. The system of claim 1, wherein the application is an optimizer application that optimizes the operation of the process plant within respect to a particular criteria.
7. The system of claim 6, wherein the particular criteria is one of cost or profit.
8. The system of claim 6, wherein the particular criteria is throughput.
9. The system of claim 6, wherein the particular criteria is consumption of a particular raw material.
10. The system of claim 1, wherein the application is a diagnostic application adapted to diagnose a problem within the process plant.
11. The system of claim 10, wherein the diagnostic application includes an alarm generation algorithm that generates an alarm to be delivered to a user based on the model output.
12. The system of claim 1, wherein the application is a display application that generates a display for a user to indicate an operation of the process plant.
13. The system of claim 12, wherein the model output is an economic operational parameter associated with one of a number of control loops of the process plant and wherein the display application is adapted to produce a display screen that displays the economic operational parameter associated with the one of the control loops to a user.

14. The system of claim 13, wherein the display application is further adapted to display other parameters associated with the one of the control loops in conjunction with the economic operational parameter associated with the one of the control loops.

15. The system of claim 13, wherein the economic operational parameter is indicative of the utilization of the one of the control loops.

16. The system of claim 13, wherein the economic operational parameter is indicative of the efficiency of a least a portion of the process plant.

17. The system of claim 13, wherein the economic operational parameter is indicative of a product production cost of the process plant.

18. The system of claim 1, wherein the application is a controller application that performs a control function within the process plant based on the model output.

19. The system of claim 1, wherein the application is a display application communicatively coupled to a control application, wherein the display application is adapted to enable a user to select a control parameter to be met by the control application based on the model output.

20. The system of claim 19, wherein the display application is adapted to use the model output to display an economic parameter associated with the control parameter selected by the user.

21. The system of claim 20, wherein the economic parameter is a savings parameter related to the different costs of operating the plant at different control settings.

22. The system of claim 20, wherein the display application enables the user to select at least one of a throughput parameter and a controlled parameter as the control parameter.

23. The system of claim 20, wherein the display application is adapted to enable the user to specify one or more economic factors associated with the operation of the process plant for use in computing the economic parameter.

24. The system of claim 23, wherein the one or more economic factors includes one of a profit per unit factor and a cost per unit factor.

25. The system of claim 1, wherein the application is a report generating application adapted to automatically prepare and send a report based on the model output.

26. The system of claim 1, further including an execution engine that executes the module during runtime of the process plant to develop the model output for delivery to the application.

27. A system for use in a process plant having a controller coupled to a plurality of field devices, comprising:

a data source including economic data related to the operation of the process plant;

a diagnostic application communicatively connected to the controller, wherein the diagnostic application is adapted to collect diagnostic data related to the operation of the process plant during operation of the process plant;

an economic model coupled to the data source and to the diagnostic application to receive and use the diagnostic data and the economic data to develop an economic parameter with respect to the operation of the process plant; and

a control application adapted to use the economic parameter to perform a control activity within the process plant.

28. The system of claim 27, wherein the control application is an optimizer application that produces a set of control target parameters for use in controlling the process plant to thereby optimize the operation of the process plant based on the economic parameter.

29. The system of claim 28, further including a display application adapted to enable a user to select one or more optimizer factors for use by the optimizer application in producing the set of control target parameters.

30. The system of claim 27, wherein the control application is a process control routine adapted to be executed on the controller to use the economic parameter to develop a control signal to be sent to one of the plurality of field devices within the process plant to thereby control the operation of the process plant.

31. The system of claim 27, further including a display application coupled to the economic model that is adapted to display the economic parameter to a user.

32. The system of claim 31, wherein the display application is adapted to display one or more diagnostic parameters associated with the diagnostic data in conjunction with the display of the economic parameter.

33. The system of claim 32, wherein the one or more diagnostic parameters includes parameters associated with the operation of a control loop within the process plant.

34. The system of claim 33, wherein the one or more diagnostic parameters includes a variability measure of one or more control signals within the control loop.

35. The system of claim 33, wherein the one or more diagnostic parameters includes an operational mode indication of one or more control blocks within the control loop.

36. The system of claim 33, wherein the one or more diagnostic parameters includes a limit indication for one or more control signals within the control loop.

37. The system of claim 33, wherein the one or more diagnostic parameters includes one or more alarms associated with one or more control blocks within the control loop.

38. The system of claim 27, wherein the data source is adapted to communicate with the economic model via a wireless communication channel.

39. The system of claim 27, wherein the data source is adapted to communicate with the economic model via a router disposed between the data source and the economic model.

40. The system of claim 38, wherein the data source is a hand held data source that is adapted to communicate with the router via a wireless communication channel.

41. The system of claim 27, further including an execution engine that executes the economic module during runtime of the process plant to develop the economic parameter for delivery to the control application.

42. A method of performing on-line control within a process plant, comprising:

establishing a first data source to collect economic data related to the operation of the process plant while the process plant is operating on-line;

establishing a second data source to collect process control data related to the control of the process plant while the process plant is operating on-line;

providing the economic data and the process control data to an economic model that models the operation of the process plant using the economic data and the process control data and producing a model output dependent on the economic data; and

using the model output to perform a function with respect to the control of the process plant.

43. The method of claim 42, wherein providing the economic data includes sending the economic data from the first data source to an information server communicatively connected between the first data source and the economic model via a first message, processing the first message at the information server to determine where the economic data contained within the first message is to be sent and automatically delivering the economic data to the economic model based on the processing.

44. The method of claim 42, including performing for a fee, the steps of producing the model output dependent on the economic data and using the model output to perform a function with respect to the control of the process plant.

45. The method of claim 42, wherein using the model output to perform a function includes providing the model output to an optimizer application, using the optimizer application to produce a set of control target parameters for use in controlling the process plant and providing the control target parameters to a controller routine to thereby optimize the operation of the process plant based on the model output.

46. The method of claim 45, wherein using the model output to perform a function includes providing the model output to a display application and using the display application

to enable a user to select one or more optimizer factors for use by the optimizer application in producing the set of control target parameters.

47. The method of claim 42, wherein using the model output to perform a function includes providing the model output to a process control routine adapted to be executed on a controller within the process plant, and using the model output in the controller routine to develop a control signal to be sent to one of a plurality of field devices within the process plant to thereby control the operation of the process plant.

48. The method of claim 42, further including coupling a display application to the economic model and using the display application to display the model output to a user.

49. The method of claim 48, including using the display application to display one or more diagnostic parameters associated with the control data in conjunction with the model output.

50. The method of claim 49, wherein the one or more diagnostic parameters includes parameters associated with the operation of a control loop within the process plant.

51. The method of claim 50, wherein the one or more diagnostic parameters includes a variability measure of one or more control signals within the control loop.

52. The method of claim 50, wherein the one or more diagnostic parameters includes an operational mode indication of one or more control blocks within the control loop.

53. The method of claim 50, wherein the one or more diagnostic parameters includes a limit indication for one or more control signals within the control loop.

54. The method of claim 50, wherein the one or more diagnostic parameters includes one or more alarms associated with one or more control blocks within the control loop.

55. The method of claim 42, including providing communications between the first data source and the economic model via a wireless communication channel.

56. The method of claim 42, including providing communications between the first data source and the economic model via a router disposed between the first data source and the economic model.

57. A method for use in a process plant, comprising:

- collecting economic data related to economic factors associated with the operation of the process plant during operation of the process plant;
- collecting process control data related to control operations within the process plant during operation of the process plant;
- configuring a model, that models the operation of the process plant using the economic data and the process control data to produce a model output, to automatically receive the economic data and the process control data on a regular basis during operation of the process plant;
- running the model during operation of the process plant to produce the model output;
- and
- using the model output to perform a function with respect to the operation of the process plant during operation of the process plant.

58. The method of claim 57, wherein collecting economic data includes collecting data pertaining to a cost of a material used in the process plant.

59. The method of claim 57, wherein collecting economic data includes collecting data pertaining to a throughput of the process plant.

60. The method of claim 57, wherein collecting process control data includes collecting the process control data at a field device disposed within the process plant.

61. The method of claim 57, wherein collecting process control data includes collecting the process control data at a process controller communicatively connected to one or more field devices disposed within the process plant.

62. The method of claim 57, wherein using the model output includes using the model output to optimize the operation of the process plant within respect to a particular criteria.

63. The method of claim 62, wherein the particular criteria is one of cost or profit.

64. The method of claim 62, wherein the particular criteria is throughput.

65. The method of claim 62, wherein the particular criteria is consumption of a particular raw material.

66. The method of claim 57, wherein using the model output includes using the model output to diagnose a problem within the process plant.

67. The method of claim 66, wherein diagnosing a problem within the process plant includes generating an alarm to be delivered to a user based on the model output.

68. The method of claim 57, wherein using the model output includes providing the model output to a display device to generate a display for a user to indicate an operation of the process plant.

69. The method of claim 68, wherein using the model includes running the model to produce a model output indicative of an economic operational parameter associated with one of a number of control loops of the process plant and wherein the display device generates a display screen that displays the economic operational parameter associated with the one of the control loops to a user.

70. The method of claim 69, wherein the display device is further adapted to display other parameters associated with the one of the control loops in conjunction with the economic operational parameter associated with the one of the control loops.

71. The method of claim 69, wherein the economic operational parameter is indicative of the utilization of the one of the control loops.

72. The method of claim 69, wherein the economic operational parameter is indicative of the efficiency of a least a portion of the process plant.

73. The method of claim 69, wherein the economic operational parameter is indicative of a product production cost of the process plant.

74. The method of claim 57, wherein using the model output includes performing a control function within the process plant based on the model output.

75. The method of claim 57, wherein using the model output includes providing the model output to a display device communicatively coupled to a control application, and using the display device to enable a user to select a control parameter to be met by the control application based on the model output.

76. The method of claim 75, wherein using the display device includes displaying an economic parameter associated with the control parameter selected by the user.

77. The method of claim 76, wherein the economic parameter is a savings parameter related to the different costs of operating the plant at different control settings.

78. The method of claim 76, wherein using the display device includes enabling the user to select at least one of a throughput parameter and a controlled parameter as the control parameter.

79. The method of claim 76, wherein using the display device includes enabling the user to specify one or more economic factors associated with the operation of the process plant for use in computing the economic parameter.

80. The method of claim 79, wherein the one or more economic factors includes one of a profit per unit factor and a cost per unit factor.

81. The method of claim 57, wherein using the model output includes automatically preparing and sending a report based on the model output.

82. A method of assisting performing process plant control, comprising:

collecting, on a regular basis at a service provider site, economic data related to economic factors associated with the operation of a process plant during operation of the process plant;

collecting, on a regular basis at a service provider site, process control data related to control operations within the process plant during operation of the process plant;

running a computer model at the service provider site that models the operation of the process plant using the economic data and the process control data to produce a model output;

using the model output at the service provider site to determine one or more actions to be performed with respect to the operation of the process plant during operation of the process plant; and

providing an indication of the one or more actions from the service provider site to the process plant for use in controlling the operation of the process plant.

83. The method of assisting performing process plant control of claim 82, further including charging a fee for one or more of running the computer model, using the computer model to determine the one or more actions and providing the indication of the one or more actions to the process plant.

84. The method of assisting performing process plant control of claim 83, wherein collecting the economic data and collecting the process control data includes collecting the economic data and the process control data at one or more information servers communicatively connected between first and second data sources and the computer model, and automatically delivering the economic data and the process control data from the one or more information servers to the computer model at the service provider site.

85. The method of assisting performing process plant control of claim 83, wherein collecting economic data includes collecting data pertaining to a cost of a material used in the process plant.

86. The method of assisting performing process plant control of claim 83, wherein collecting economic data includes collecting data pertaining to a throughput of the process plant.

87. The method of assisting performing process plant control of claim 83, wherein collecting process control data includes collecting the process control data at a field device disposed within the process plant.

88. The method of assisting performing process plant control of claim 83, wherein collecting process control data includes collecting the process control data at a process controller communicatively connected to one or more field devices disposed within the process plant.

89. The method of assisting performing process plant control of claim 83, wherein using the model output includes using the model output to determine an action designed to optimize the operation of the process plant within respect to a particular criteria.

90. The method of assisting performing process plant control of claim 89, wherein the particular criteria is one of cost or profit.

91. The method of assisting performing process plant control of claim 89, wherein the particular criteria is throughput.

92. The method of assisting performing process plant control of claim 89, wherein the particular criteria is consumption of a particular raw material.

93. The method of assisting performing process plant control of claim 83, wherein using the model output includes using the model output to determine an action related to alerting to the existence of or correcting a detected problem within the process plant.

94. The method of assisting performing process plant control of claim 93, wherein the action related to alerting to the existence of or correcting a detected problem includes generating an alarm to be delivered to a user.

95. The method of assisting performing process plant control of claim 83, wherein using the model output includes providing information for display to a user to indicate an operation of the process plant.

96. The method of assisting performing process plant control of claim 83, wherein using the computer model includes running the computer model to produce a model output indicative of an economic operational parameter associated with one of a number of control loops of the process plant and wherein the one or more actions includes generating a display screen that displays the economic operational parameter associated with the one of the control loops for viewing by a user.

97. The method of assisting performing process plant control of claim 96, furthering including displaying other parameters associated with the one of the control loops in conjunction with the economic operational parameter associated with the one of the control loops on the display screen.

98. The method of assisting performing process plant control of claim 96, wherein the economic operational parameter is indicative of the utilization of the one of the control loops.

99. The method of assisting performing process plant control of claim 96, wherein the economic operational parameter is indicative of the efficiency of a least a portion of the process plant.

100. The method of assisting performing process plant control of claim 96, wherein the economic operational parameter is indicative of a product production cost of the process plant.

101. The method of assisting performing process plant control of claim 83, wherein the one or more actions includes performing a control function within the process plant.

102. The method of assisting performing process plant control of claim 83, wherein the one or more actions includes providing a display to enable a user to select a control parameter to be met by a control application based on the model output.

103. The method of assisting performing process plant control of claim 102, wherein providing the display includes displaying an economic parameter associated with the control parameter selected by the user.

104. The method of assisting performing process plant control of claim 103, wherein the economic parameter is a savings parameter related to the different costs of operating the plant at different control settings.

105. The method of assisting performing process plant control of claim 102, wherein providing the display includes enabling the user to select at least one of a throughput parameter and a controlled parameter as the control parameter.

106. The method of assisting performing process plant control of claim 102, wherein providing the display includes enabling the user to specify one or more economic factors associated with the operation of the process plant for use in computing the economic parameter.

107. The method of assisting performing process plant control of claim 106, wherein the one or more economic factors includes one of a profit per unit factor and a cost per unit factor.